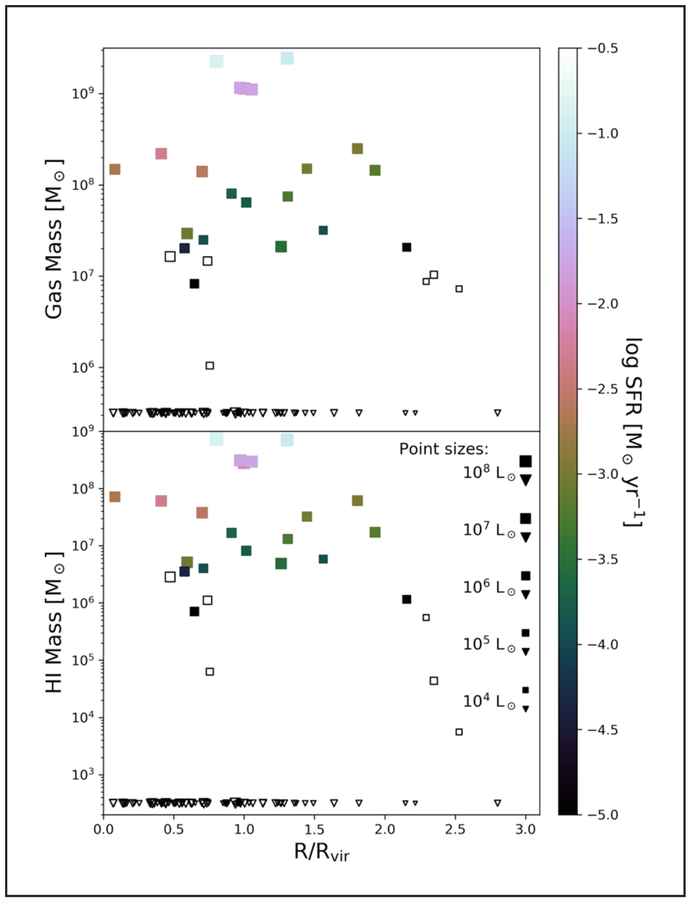
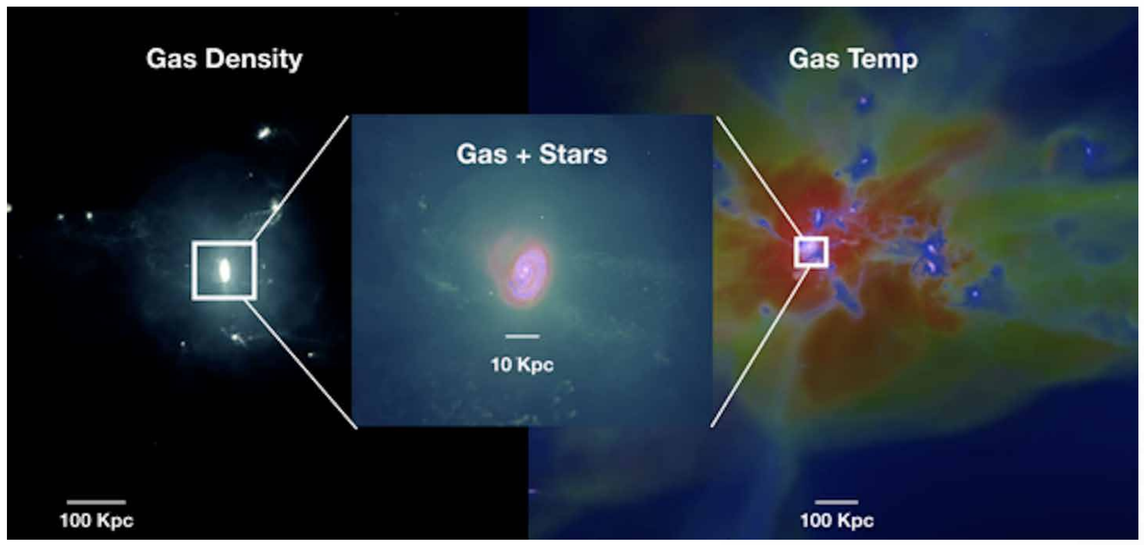


Simulated gas and HI (neutral gas) masses as a function of distance, colored by star formation rate, and sized by V-band luminosity. Unfilled points represent quenched galaxies (not forming stars); triangles represent galaxies without gas. Most bright satellites are actively forming stars; all UFDs are quenched, and most UFDs have no gas content at all. However, several UFD and faint dwarf galaxies have appreciable gas mass despite not being star-forming. The prediction of UFDs containing gas is a surprise to observers hunting for these objects. *Elaad Applebaum, Alyson Brooks, Rutgers University*



A rendering of the Milky Way-like galaxy simulation "Sandra" in gas density (left), gas and stars (middle), and gas temperature (right). In the left image, the brightest regions show the densest gas; in the middle image, the red and blue represent old and young stars, respectively; and in the right image, hot gas is red, and cold gas is blue. Notice that around Sandra there are many smaller, dwarf galaxies, which are the focus of this study. *Elaad Applebaum, Rutgers University; Ferah Munshi, University of Oklahoma*

National Aeronautics and Space Administration

The Milky Way and Its Neighbors: Simulating Ultra-Faint Dwarf Galaxies

Although recent surveys by observatories like NASA's Hubble Space Telescope have greatly increased our knowledge of nearby dwarf and ultra-faint dwarf (UFD) galaxies, many uncertainties remain—including star formation histories, chemical compositions, kinematics, and distributions around the Milky Way. Modern cosmological hydrodynamic simulations have not been able to probe UFDs in the distant field, and because our best observational samples are near the Milky Way, the ability to interpret current and future observations requires Milky Way simulations that are capable of resolving down to the UFD range. To meet this challenge, we developed the "DC Justice League" suite of Milky Way cosmological zoom-in simulations, using NASA HPC resources.

Jordan Van Nest, Ferah Munshi, University of Oklahoma

www.nasa.gov

SCIENCE MISSION DIRECTORATE

NASA EXPLORES THE UNIVERSE